

Appln. No.: 09/942,835
Amendment Dated September 17, 2004
Reply to Office Action of September 14, 2004

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Remarks/Arguments:

Claims 1, 3, 7-11, 13-18, 20-21, 31 and 32 are pending and stand rejected. By this Amendment, claim 7 and 18 are amended.

Applicant contends that no new matter has been added by the claim amendment, and accordingly, entry and approval of same is respectfully requested.

Rejection Under 35 U.S.C. §112, second paragraph

Claims 1, 11 and 18 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Applicants respectfully traverse the rejection of claims 1, 11, and 18 and request reconsideration.

Claim 1

In the Action at item 2, the Examiner contends that the recitation in claim 1 of:

apparatus for stabilizing the inter-electrode gap selected from a group consisting of: a semiconductor region of the first conductivity type but having a different dopant concentration than the substrate, in the inter-electrode gap; and means for applying respective bias potentials to the at least two gate electrodes, the bias potentials being sufficient to cause a fringing field to extend across the inter-electrode gap from at least one of the at least two gate electrodes

is unclear. More particularly, the Examiner asks whether the Applicant is trying to state "apparatus for stabilizing the inter-electrode gap comprising ... a semiconductor region ... two gate electrodes."

Applicants believe that the Examiner does not fully appreciate the claimed invention, and requests that the Examiner review the specification at paragraphs [0012], [0040], [0047],

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[0048], [0053], [0062], [0064], and [0069] to [0073] with regard to stabilization of the inter-electrode gap. In particular, as disclosed in the original specification at paragraph [0069] "the inter-electrode gap may be stabilized by fringing fields extending into the gap from **suitably biased gate electrodes or by a self-aligned N-- diffusion 414,**" (emphasis added).

Thus, the apparatus for stabilizing the inter-electrode gap is selected from either (1) "a semiconductor region of the first conductivity type but having a different dopant concentration than the substrate, in the inter-electrode gap" or (2) "**means for applying respective bias potentials** to the at least two gate electrodes, the bias potentials being sufficient to cause a fringing field to extend across the inter-electrode gap from at least one of the at least two gate electrodes," (emphasis added; see claim 1). Moreover, the means for applying respective bias potentials, as an example, includes a timing circuit 15 to generate a clock signal (i.e., signal ϕ_{TR}) to apply a respective bias potential to the gate electrode 104' (see also the specification at paragraph [0066] and FIG. 6).

Accordingly, claim 1 is not subject to rejection under 35 U.S.C. §112, second paragraph, as being indefinite.

Claims 11 and 18

Claims 11 and 18 are not subject to rejection under 35 U.S.C. §112, second paragraph, for reasons similar to those of claim 1.

Claim Rejections under 35 U.S.C. §102(b)

In the Office Action at item 4, claims 1 and 32 were rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 4,952,523 to Fujii.

Applicants respectfully traverse this rejection and request reconsideration.

Claim 1

Claim 1 is directed to a charge coupled device, and recites "at least two gate electrodes overlaying the dielectric layer, the at least two gate electrodes configured to

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define at least two charge wells, ... the at least two gate electrodes being separated by an inter-electrode gap."

Fujii Reference

In the Action at page 3, lines 8-16, the Examiner contends that Fujii teaches "the at least two gate electrodes (42, 44) overlaying the dielectric layer, the at least two gate electrodes configured to define at least two charge wells (the n and p regions of the substrate), the at least two gate electrodes being separated by an inter-electrode gap (the gap between 42 and 44) and apparatus for stabilizing the inter-electrode gap, is a semiconductor region (36) of the first conductive type but having a different dopant concentration than region (32), in the inter-electrode gap.

Applicants respectfully disagree with this contention, because Fujii clearly shows in FIGS. 8 and 9 that the second p-type silicon region 36 (i.e., which the Examiner corresponds to the semiconductor region of the first conductive type recited in claim 1) is of opposite type to the n-type material in which the charge wells are formed. The subject invention, as defined by claim 1, requires that the charge wells formed by the gate electrodes be formed in the substrate of the first conductivity type and that the stabilizing implant also be of the first conductivity type. Fujii does not meet this limitation because, in Fujii, the charge wells are formed in the n-type layer 32 while the implants 36 are p-type implants. This claim limitation is illustrated in Fig. 4A of the subject application in which the charge wells are formed in the n-type region 100 and the stabilizing implant is an n-implant 414. (See paragraph [0053] of the subject application).

In the Office Action, it was stated that elements in the preamble were not given patentable weight. The proper test is given in MPEP § 7.37.10:

7.37.10 Unpersuasive Argument: Limitation(s) in Preamble In response to applicant's arguments, the recitation has not been given patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

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This test was misapplied in the Office Action because the recitations that the device is "made according to a standard CMOS process" and that it is made "on a substrate of a first conductivity type" are not merely recitations of "the purpose of a process or the intended use of a structure." Instead, these are limitations that are referenced in the body of the claim. Thus, the body of the claim depends on the preamble for completeness and these limitations may not be ignored.

Because claim 1 requires that the substrate is formed of the first conductivity type, the charge wells are formed in the substrate and that the implant layer be of the first conductivity type, claim 1 recites structure that is not found in Fujii. Accordingly, claim 1 is not subject to rejection as being anticipated by Fujii.

Claim 32

Dependent claim 32 includes all of the features of claim 1 from which it depends. Thus, claim 32 is not subject to rejection under 35 U.S.C. § 102(b) as being anticipated by Fujii for the reasons set forth above concerning the rejection of claim 1.

Rejection under 35 U.S.C. §103(a)

In the Action at item 5, pages 4-7, claims 3, 7, 8-11, 13-15, 18, 20, 21 and 31 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Fujii in view of U.S. Patent No. 5,210,433 to Ohsawa et al. (hereafter referred to as Ohsawa).

Claims 3 and 8-10

Dependent claims 3 and 8-10 include all of the features of claim 1 from which they depend. Accordingly, claims 3 and 8-10 are patentable over Fujii for the reasons set forth above concerning the rejection of claim 1.

It is submitted that the additional reference of Ohsawa does not overcome the deficiencies of the Fujii because Ohsawa does not disclose or suggest:

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... a substrate of a first conductivity type ... at least two gate electrodes overlaying the dielectric layer, the at least two gate electrodes configured to define at least two charge wells in the substrate, ... the at least two gate electrodes being separated by an inter-electrode gap; and apparatus for stabilizing the inter-electrode gap selected from a group consisting of: **a semiconductor region** of the first conductivity type but having a different dopant concentration than the substrate, **in the inter-electrode gap**; and means for applying respective bias potentials to the at least two gate electrodes, the bias potentials being sufficient to cause a fringing field to extend across the inter-electrode gap from at least one of the at least two gate electrodes,

(emphasis added), because in the Ohsawa device, the small gaps G_v between the vertical transfer control electrodes 20 are provided with an insulating layer 44 and, thus, cannot be a semiconductor region and, furthermore, there is no disclosure in Ohsawa, or in the combination of Fujii and Ohsawa that fringing fields are generated or that the fringing fields can be effectively used as stabilization means.

Accordingly, claims 3 and 8-10 for the reasons set forth above are not subject to rejection as obvious over Fujii in view of Ohsawa.

Claim 11

Claim 11 includes features similar to those of claim 1, and is submitted to be allowable for reasons similar to the above mentioned reasons concerning claim 1.

Dependent claims 13-15 depend from claim 11 and are not subject to rejection under 35 U.S.C. § 103 (a) as being unpatentable over Fujii in view of Ohsawa for at least the same reasons as claim 11.

Claims 18 and 20-21

Claim 18 includes features similar to those of claim 1 and is submitted to be allowable for reasons similar to the above mentioned reasons concerning claim 1. Claim 18 differs from claim 1 in that the charge wells are formed in the "n-well region of the second conductivity

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type" but also differs from claim 1 in that the stabilizing implant is defined to be "of the second conductivity type." Thus, claim 18, similar to claim 1 requires the implant to be of the same type as the material beneath the dielectric layer. As described above, the implants disclosed by Fujii are of the opposite conductivity type of the material beneath the dielectric layer.

With regard to claims 18 and 20-21, in the Action at page 7, lines 13-15, the Examiner concedes that "Fujii does not teach back illuminated imager being (sic) shielded from photocarriers generated in response to photons received at the backside of the substrate by the semiconductor junction."

However, in the Action at page 7, lines 16-17, the Examiner contends that "[b]ack illuminated imager is conventional structure that is well known in the art. Furthermore providing shielding structure is also known in the art."

This use of Official Notice is not consistent with USPTO policy, as stated in the memorandum of February 21, 2002 from Stephen G. Kunin, Deputy Commissioner for Patent Examination Policy to the Patent Examining Corps Technology Center Directors.

In the memorandum entitled: "Procedures for relying on facts which are not of record as common knowledge or for taking Official Notice," it is stated:

Official notice unsupported by documentary evidence should only be taken by the examiner where the facts asserted to be well-known, or to be common knowledge in the art are capable of instant and unquestionable demonstration as being well-known ...

It would not be appropriate for the examiner to take official notice of facts without citing a prior art reference where the facts asserted to be well known are not capable of instant and unquestionable demonstration as being well-known. For example, assertions of technical facts in the areas of esoteric technology or specific knowledge of the prior art must always be supported by citation to some reference work recognized as standard in the pertinent art.

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It is never appropriate to rely solely on "common knowledge" in the art without evidentiary support in the record, as the principal evidence upon which a rejection was based ... (emphasis in original)

Applicants respectfully traverse the Official Notice, common-knowledge, assertion upon which the rejection of claims 18 and 20-21 was based. There is no substantial evidence in the record that providing a P-N junction as a shielding structure for a back illuminated imager is well known in the art

The Examiner continues to assert that this element of claims 18, 20-21 is well known after having been requested to provide suitable references to support same in the previous response filed March 17, 2004. Applicant again respectfully request that a "citation to some reference work recognized as standard in the pertinent art" be provided or the rejection be withdrawn.

Claim 7

Claim 7 is amended to clarify the invention and now recites "means for stabilizing the inter-electrode gap including means for applying respective bias potentials to the at least two gate electrodes, the bias potentials being sufficient to cause a fringing field to extend across the inter-electrode gap from at least one of the at least two gate electrodes to stabilize the inter-electrode gap by preventing charge barriers from interfering with charge transfer between adjacent gate electrodes."

In the Action at page 5, lines 1-5, with regard to claim 7, the Examiner contends that Fujii teaches substantially the entire claimed structure of claim 1 above including the means for stabilizing the inter-electrode gap includes means for applying respective bias potentials to the at least two gate electrodes, the bias potentials being sufficient to cause fringing fields from the at least two gate electrodes to extend into the inter-electrode (sic) gap."

In the Action at page 5, lines 6-8, the Examiner further contends that "Ohsawa teaches (fig. 11) means for controlling gap potential. Therefore the combined structure of Fujii and Ohsawa inherently cause fringing fields as claimed in the gap region."

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The requirements for an item to be inherent in a disclosure are well settled.

As stated by the Federal Circuit:

To serve as an anticipation, when the reference is silent about the asserted inherent characteristic, such gap in the reference may be filled with recourse to extrinsic evidence. Such evidence must make clear that the missing descriptive matter is necessarily present in the thing described in the reference and that it would be so recognized by persons of ordinary skill in the art. *Continental Can Co. USA v. Monsanto Co.*, 948 F.2d 1264, 20 USPQ 2d 1746, 1749 (Fed. Cir. 1991).

In this regard, the CCPA has added that "inherency ... may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *In re Oelrich*, 666 F.2d 578, 581, 212 USPQ 323, 326 (CCPA 1981). That is, the missing element or function must necessarily result from the prior art reference(s).

In particular, it is Applicant's contention that sufficient bias potentials must be applied to cause fringing fields from the at least two gate electrodes to extend into the inter-electrode gap. Thus, the Examiner conclusory statement regarding the fringe field being inherent is incorrect.

Lack of Proper Motivation to Modify Fujii, regarding claim 7

"[T]he mere fact that a worker in the art could rearrange the part of the reference device to meet the terms of the claims on appeal is not by itself sufficient to support a finding of obviousness. The prior art must provide a motivation or reason for the worker in the art, without the benefit of appellant's specification, to make the necessary change in the reference device." See *Ex parte Chicago Rawhide Mfg. Co.*, 223 USPQ 351, 353 (Bd. Pat. App. & Inter. 1984).

A prima facie obviousness rejection requires that the modification of one reference be

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based on motivation evidenced in the record. The cited art does not suggest any motivation to modify Fujii to control gap potential to cause a fringing field to extend across the inter-electrode gap to suitably stabilize the inter-electrode gap. Thus, a rejection based on the rationale given by the Examiner is improper.

Accordingly, claim 7 is not subject to rejection as being unpatentable over Fujii in view of Ohsawa.

Claims 16 and 17

In the Action at item 5, page 8, claims 16 and 17 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Fujii in view of U.S. Patent No. 6,196,932 to Marsh et al. (hereafter referred to as Marsh)

Claims 16 and 17, respectfully, recite "a single monolithic integrated circuit including: a charge coupled device (CCD) imager array; and a complementary metal oxide semiconductor (CMOS) analog to digital converter coupled to receive image signals from the CCD imager array." Thus, the CCD imager array and complementary metal oxide semiconductor analog to digital converter are included in a **single** monolithic integrated circuit, (emphasis Added). Nothing in either of the Fujii or Marsh references discloses or suggests such a single monolithic integrated circuit.

Marsh Reference

Marsh pertains to a method of providing feedback from a sports apparatus having a surface for impacting an object. More specifically, a golf club is disclosed as including a pressure sensor on the head of the club, which detects and measures the force of impact, relaying the calculated results to the user via an LED display. Marsh uses analog-to-digital converters in sampling data from the sensors on the golf club.

Furthermore, the subject application pertains to a CMOS-CCD imaging system, and falls well beyond the field of endeavor of the Marsh invention. Additionally, Applicants have not found any disclosure in Fujii of an analog to digital converter. Therefore, the Action has relied upon hindsight gained from Applicants' disclosure to reject these claims.

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To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the references or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. ***The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicants' disclosure.*** (emphasis added MPEP § 706.02(j)).

The Examiner has relied upon hindsight to arrive at the determination of obviousness. It is impermissible to use the claimed invention as an instruction manual or template to piece together the teachings of the prior art so that the claimed invention is rendered obvious. The Court has stated that "[o]ne cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention." *In re Fritch*, 23 USPQ 2d 1780, 1783, 1784 (Fed. Cir. 1992).

The Examiner may not combine references based on hindsight gained from the subject invention.

As previously stated "the mere fact that a worker in the art could rearrange the part of the reference device to meet the terms of the claims on appeal is not by itself sufficient to support a finding of obviousness. The prior art must provide a motivation or reason for the worker in the art, without the benefit of appellant's specification, to make the necessary change in the reference device." See *Ex parte Chicago Rawhide Mfg. Co.*, 223 USPQ 351, 353 (Bd. Pat. App. & Inter. 1984).

A prima facie obviousness rejection requires that the modification of one reference be based on motivation evidenced in the record. The cited art does not suggest any motivation to modify Fujii to include a CMOS, analog-to-digital converter, and, in particular, to include a single monolithic circuit having a CCD imager array and a CMOS, analog-to-digital converter. Thus, a rejection based on the rationale given by the Examiner is improper.

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The failure to find any reference that combines CCD and CMOS technologies demonstrates the accuracy of Applicants' assertions in their specification and emphasizes the Action's reliance on hindsight to make this rejection.

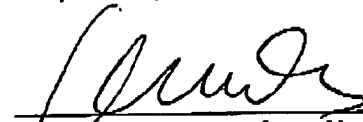
Accordingly, claims 16 and 17 are not subject to rejection as being unpatentable over Fujii in view of Marsh.

Conclusion:

In view of the foregoing amendments and remarks, Applicants request that the Examiner reconsider and withdraw the rejection of claims 1, 3, 7-11, 13-18, 20, 21, 31 and 32.

Reconsideration is respectfully requested.

Respectfully submitted,



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